COVID-19 Research

ISSUE SUMMARY:

EPA researchers are building on an expansive body of world-class research and applying that knowledge to reduce the risk of exposure to SARS-CoV-2, the virus that causes COVID-19. EPA is focusing its COVID-19 research efforts in four main areas: Aerosols Modeling and Inactivation, Cleanup and Disinfection Evaluation, Wastewater Virus Monitoring and Detection, and Salivary Antibody Assay Development.

For *Modeling Aerosols and Evaluating Devices and Products to Inactivate Aerosolized Virus*, researchers are:

- **Modeling Aerosol Transport in an Office Setting** - EPA researchers are studying indoor air pathways to determine whether exhaled aerosols spread over distance in an office environment.
- **Supporting a Study on Aerosol Transport in a Mass Transit Setting** – EPA researchers are participating in a study led by the Department of Homeland Security (DHS) Science &Technology and the New York City Metropolitan Transit Authority (NYC MTA) that will assess the behavior of aerosols in buses and subway train cars.
- **Evaluating pesticide devices and products to inactivate aerosolized virus and reduce potential transmission -** EPA researchers will assess how effective different devices and product technologies are in reducing airborne virus concentrations in indoor environments. The general classes of devices and products under consideration include UV-C devices, chemical-based devices and products, and physical removal devices.

For *Cleanup and Disinfection Evaluation*, researchers are evaluating and developing:

- **Long-Lasting Disinfectants** – evaluating long-term effectiveness of anti-microbial coatings and application methods for surfaces and objects that are frequently touched by many different people.
- **Alternative Disinfection Technologies** – evaluating innovative ways to disinfect large spaces, including alternative methods to kill viruses such as ultraviolet (UV) light, ozone, and steam, as well as disinfectant application methods such as electrostatic sprayers or foggers.
- **PPE Disinfection** – evaluating practical and effective methods of disinfecting PPE and whether those methods damage the PPE.
- **Rapid Viability - Reverse Transcriptase Polymerase Chain Reaction (RV-RTPCR) Method** - To determine the effectiveness of disinfection approaches, researchers are developing a method to quickly analyze surface samples for the live virus, both before and after the disinfection process.
- **Real-World Surface Disinfection** (CARES Act)– developing decontamination methods and applications using EPA List-N products to disinfect large or complex areas with a variety of surfaces.
- **Surface Sampling Efficiency** (CARES Act) – determining environmental sampling efficiency and level-of-detection for SARS-CoV-2 on various surfaces and materials.
- **Disinfection for Mass Transit** – collaborating with transit authorities to help evaluate long-lasting disinfectants (more information under Background).

For *Wastewater Virus Monitoring and Detection*, researchers at EPA and CDC are developing methods for measuring SARS-CoV-2 levels in wastewater. This work includes:

- **Standardized Methods to Assess Virus in Sewage** – developing, evaluating, and applying methods for concentrating and quantifying SARS-CoV-2 by molecular and live assays in wastewater.
- **Developing an Approach to Monitor Community Infection** – rapidly assessing a molecular approach to monitor infection, in collaboration with regional sewer districts, and initiating a pilot monitoring effort to understand factors affecting virus signal in sewage.

For *Salivary Antibody Assay Development*, researchers at EPA and CDC are developing a:

- **Simple, easy, low-cost, noninvasive antibody test using saliva samples –** to help identify people who have been exposed to SARS-CoV-2, including those who may have been asymptomatic, and who have subsequently developed an immune response.

UPCOMING MILESTONES:

- **Winter 2020** - The RV-RTPCR method will be available for environmental samples, as well as to help assess sampling efficiency on environmental surfaces, and to support studies that are aimed at better understanding transmission routes.
- **Spring 2021** - A comprehensive long-lasting disinfection report assessing product capabilities, including durability, and refinement of the testing method; information to support stakeholder decisions for use of registered products.
- **Spring 2021** - An assessment of the effectiveness of the electrostatic sprayer application method for use with disinfectants on real-world surfaces. This method is the primary way that stakeholders are applying disinfectant products, including the antimicrobial products being tested for long-lasting disinfection.
- **Spring 2021** - An understanding of the effectiveness of readily available disinfection products for use on numerous PPE material types.
- **Summer 2021** - An assessment of the effectiveness of disinfectants and cleaning methods for real-world, complex materials to support refinement of cleaning and disinfection plans.
- **Summer 2021** - Data to show appropriate dose for the efficacy of UV light and ozone against SARS-CoV-2.

BACKGROUND:

CARES Act

EPA's Office of Research & Development received $1.5 million from supplemental funding contained in the Coronavirus Aid, Relief and Economic Security (CARES) Act. This money funded the real-world surface disinfection and surface sample efficiency work.

Transit Collaborations

As part of the research on long-lasting disinfectants, EPA is collaborating with transit authorities in New York and Los Angeles. Transit authorities are currently following disinfection protocols that are burdensome, expensive, and time consuming. Transit authorities need more efficient and effective solutions. Disinfectants with residual, or long-lasting, efficacy can significantly reduce potential exposure, particularly when cleaning/disinfection cannot be accomplished after each person touches a surface.

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This research is not limited to New York City or Los Angeles, or to transit systems; products showing residual efficacy could be applied to other areas and public spaces.

Wastewater Surveillance Research: Collaboration with Ohio

Concurrent with the research above, ORD is engaged as a partner in the development of a State of Ohio SARS-CoV-2 wastewater monitoring plan. The Ohio wastewater monitoring plan began in early August and is currently sampling over 20 cities. A network of labs, including the ORD lab in Cincinnati, contribute to the data collection and analysis. In September, Ohio began posting the wastewater monitoring results on its public Coronavirus Dashboard. These results are used by the Ohio governor and state health department as an additional metric for determining public health advisory levels.

This collaboration and EPA's wastewater research will help inform public health agencies as they rapidly respond to the pandemic. The approach will help monitor both symptomatic and asymptomatic individuals, potentially providing an additional tool for health departments to assess the status of community infection rates.

KEY EXTERNAL STAKEHOLDERS:

☒ Congress	☒ Industry	☒States	☒ Tribes	☒ Media	☒ Other Federal Agency
☐ NGO	☒ Local Government		☐ Other (Local unions)		

States, tribes, and local governments need information to make decisions to protect their citizens. EPA is working with other agencies (CDC). Congress and the media are interested in this work as well.

MOVING FORWARD:

- **Possible Extension of Ohio Wastewater Collaboration**– The Ohio surveillance network, including ORD's contributions, is scheduled to run through December 2020, with possible extension of the effort depending on the pandemic situation in the new year.
- **Transport of Aerosols in an Indoor Office Space Setting** – ORD researchers have just begun a new project to study indoor air pathways to determine whether exhaled aerosols spread over distance in an office environment. Indoor air transport modeling has provided important understandings for virial transmission in several settings, including medical facilities and commercial aircraft.

LEAD OFFICE/REGION: ORD

OTHER KEY OFFICES/REGIONS: OW, OCSPP, OAR